

REMARKSStatus of the claims:

Claims 1-3 have been amended, claims 1-9 are pending with claims 6-9 having been withdrawn from a prior restriction requirement. No new matter has been incorporated. The amendment to claim 1 comes from Lines 15-21 on page 2 of the written description. Thus, claims 1-5 are ready for further action on the merits.

Claim Objections

Claim 3 has been objected to under 37 C.F.R. § 1.75(c) for a failure to further limit claim 1, the claim from which claim 3 depends. The Examiner has asserted that because rubber is converted to a molten state and melt-kneaded with thermoplastic resin, and because the rubber is treated initially, it must necessarily be upstream from the thermoplastic. Applicants contend that in claim 1, the feeding position of the moltenized rubber into the main extruder is not specifically limited. But in claim 3, the feeding position of the moltenized rubber is limited as downstream from that of the thermoplastic resin. Accordingly, it is believed that claim 3 has a more limited scope than claim 1. Withdrawal of the objection is respectfully requested.

Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 1-5 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite.

In claim 1, the Examiner asserts that it is unknown what is meant by the phrase "molten by a rubber kneading machine" because the relationship between molten and the rubber kneading machine is unknown. Claim 1 has been amended to recite "a solid rubber is turned into a molten rubber by a rubber kneading machine". It is believed that the relationship between molten and the rubber kneading machine is no longer ambiguous. Withdrawal of the rejection is respectfully requested.

In claim 1, the Examiner asserts that it is unknown what is meant by the phrase "and fed into an extruder". From lines 15-21 on page 2 of the written description it should be apparent to one of skill in the art that it is the molten rubber that is fed into the extruder. It is believed that this phrase is no longer indefinite. Withdrawal of the rejection is respectfully requested.

In claim 1, the Examiner asserts that it is not clear if an extruder is used to treat the rubber prior to addition of the rubber to the thermoplastic. Applicants must respectfully point out that this is not a limitation in the claim and that an extruder can but does not have to be used to treat the rubber prior to addition of the rubber to the thermoplastic.

Accordingly, it is submitted that this rejection is inapposite. Withdrawal of the rejection is respectfully requested.

In claim 2, the Examiner asserts that the meaning of the phrase "a melt viscosity" is indefinite. Claim 2 has been amended changing "a melt viscosity of the rubber" to "the rubber's viscosity". Thus, it is believed that with this change, this phrase is no longer indefinite. Withdrawal of the rejection is respectfully requested.

In claim 2, the Examiner has also asserted that it is unclear what is the relationship between the diameter of the extruder and the viscosity of the rubber. Melt viscosity is usually independent of the nozzle diameter, but sometimes with rubbers, they may sometimes be dependent. It is believed that the relationship has now been established. Withdrawal of the rejection is respectfully requested.

In claim 3, the Examiner asserts that there is a lack of antecedent basis in that claim 3 implies that the process of claim 3 is done in one extruder, whereas there is no indication that claim 1 is performed in a single extruder. It is believed that the amendments to claims 1 and 3 correct any ambiguities with respect to this rejection. Withdrawal of the rejection is respectfully requested.

In claim 4, the Examiner asserts that the phrase "block-like" is indefinite. By the term "block-like" Applicants refer

to a geometric shape and not a polymer segment. It is believed that this term is no longer indefinite. Withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. § 102

Claims 1-5 are rejected under 35 U.S.C. § 102(e) as being anticipated by Guntherberg '399 (US Patent No. 6,165,399). The Examiner asserts that Guntherberg '399 discloses the blending of polymeric components where elastomeric component A is converted to a melt and then blended with a thermoplastic. This rejection is traversed for the following reasons.

The Guntherberg '399 reference uses, as a feeding material into the extruder, a water-moist elastomer component containing up to 60% residual water. Moreover, the reference says in the Example that the metering sections for elastomers are unheated. (e.g. column 23, lines 6-9, column 23, lines 62-65, claim 9, etc.). Thus, the reference does not teach feeding a molten rubber into an extruder at all. The instant method as claimed in claim has the feature that a molten rubber is fed into an extruder. Accordingly, Guntherberg '399 can not anticipate the instant invention. Withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Guntherberg '399 in view of Furuta '765 (US Patent No. 5,997,765) or Haider '073 (US Patent No. 5,216,073). The Examiner asserts that Guntherberg '399 does not disclose applicants elected species. The Examiner uses Furuta '765 and Haider '073 to disclose compositions containing elastomeric ethylene/acrylic rubber and liquid crystal polyesters. This rejection is traversed for the following reasons.

Present Invention

The present invention discloses a method of producing a composition comprising a thermoplastic resin and a rubber. This method comprises taking a solid rubber, turning this rubber into a molten rubber by a rubber kneading machine, and then feeding the molten rubber into an extruder. The molten rubber is then melt-kneaded with a thermoplastic resin in the extruder.

Disclosure of Guntherberg '399

Guntherberg '399 discloses a process for preparing thermoplastics or polymer blends comprising (A) from 5 to 95% of a water-moist elastomer component containing up to 60% of residual water, (B) from 5 to 95% of a thermoplastic polymer,

(C) from 0 to 95% of a further polymer, and (D) from 0 to 70% of additives. The process comprises mixing the components A to D in an extruder with mechanical de-watering of component A. The extruder has at least two rotating screws and, in the conveying direction, is essentially composed of a metering section into which component A is fed. The extruder also has a squeeze section which serves for dewatering component A and contains a retarding element and an associated dewatering orifice which is present upstream of the retarding element by a distance corresponding to at least one screw diameter. The extruder also has a feed section in which the thermoplastic polymer B is introduced as a melt into the extruder, a plastication section with mixing or kneading elements, a devolatilization section with an orifice where any remaining water is removed as steam, and a discharge zone.

Disclosure of Furuta '765

Furuta '765 discloses a liquid crystal polyester resin composition comprising a liquid crystal polyester (A) in a continuous phase and a rubber having a functional group reactive with the liquid crystal polyester (B) in a dispersed phase.

Disclosure of Haider '073

Haider '073 discloses a moldable thermoset composition comprising about 5-60% liquid crystal polymer and about 95-40% of an epoxy-functional rubber by weight. Haider '073 also discloses a process for making and a process for this composition. The composition is made by melt mixing the LCP and the epoxy-rubber to form a blend. This blend is then cooled and may be molded, extruded, or otherwise formed into a desired shape. The composition is then heat-treated to make it set.

Removal of Guntherberg '399 in view of Furuta '765 or Haider '073

One of the important features of the present method is to feed a moltenized rubber into an extruder to melt-knead with a thermoplastic resin. As was discussed above, Guntherberg '399 does not teach this process wherein moltenized rubber is fed into an extruder to melt-knead with a thermoplastic resin.

Furuta '765 and Haider '073 disclose compositions similar to the composition of the instant invention, but neither Furuta '765 nor Haider '073 disclose or suggest the process of the present invention in which a molten rubber is fed into an extruder. This is an element that is present in claim 1.

Accordingly, the Examiner has failed to make out a *prima facie* case of obviousness with regard to the 35 USC §103(a)

rejection over Guntherberg '399 in view of Furuta '765 or Haider '073. Three criteria must be met to make out a *prima facie* case of obviousness.

- 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
- 2) There must be a reasonable expectation of success
- 3) the prior art reference (or references when combined) must teach or suggest all the claim limitations.

See MPEP §2142 and *In re Vaeck*, 20 USPQ2d 1438 (CAFC, 1991). In particular, the Examiner has failed to meet the third element to make a *prima facie* obviousness rejection. None of the references teach the method of the instant invention. In particular, none of the cited references disclose or suggest feeding molten rubber into an extruder. Thus, the rejection of claims 1-5 over Guntherberg '399 in view of Furuta '765 or Haider '073 can not stand. Withdrawal of the rejection is not only warranted, it is respectfully requested.

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.


If any questions remain regarding the above matters, please contact Applicant's representative, Andrew D. Meikle, in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A method of producing a composition comprising a thermoplastic resin and a rubber, wherein a solid rubber is turned into a molten rubber by a rubber kneading machine and fed into an extruder, and the molten rubber is melt-kneaded with the thermoplastic resin in the extruder.

2. (Amended) The method of producing a composition according to claim 1, wherein the rubber is molten:

at a temperature where a rubber's [melt] viscosity [of the rubber] on extrusion from a nozzle having a diameter of 0.5 mm and a length of 10 mm at a shear rate of 100 sec^{-1} is from 100 to 30000 poise; or

at a temperature where a melt index of the rubber under a load of 2.16 kfg is from 2 to 20 g/10 minutes.

3. (Amended) The method of producing a composition according to claim 1, wherein [the feeding portion of] the thermoplastic resin is fed [located] at a downstream position of the extruder [compared with the feeding position of than] relative to the molten rubber.